

# Installing OMERO.searcher

## Local Client version 1.3 in MacOSX

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The instructions described in this document explain how to install the prerequisites in MacOSX 10.8.\* If you have successfully installed CellOrganizer for Python in your Mac, then skip to Section II.

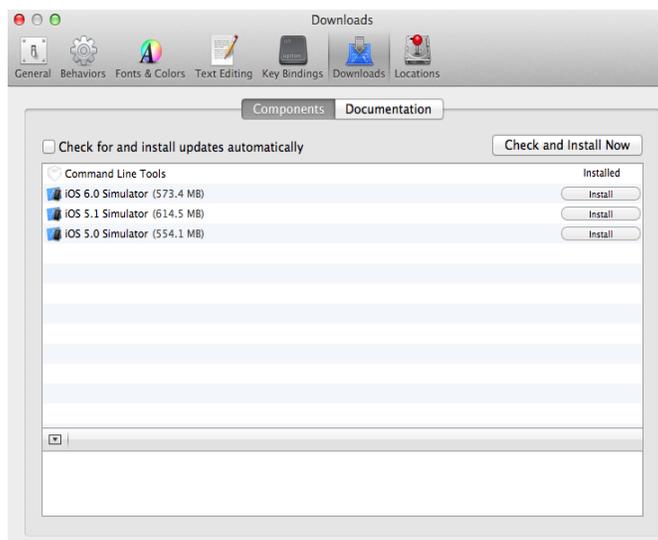
### I. Prepare your computer to install the prerequisites

Before we start installing the prerequisites for OMERO.searcher we need to make sure you have all the necessary libraries and compilers to install them.

1. **Install XCode.** You can install XCode in the Mac App Store by clicking [here](#) or visit the App Store. For more information about XCode click <https://developer.apple.com/xcode/>.

If you have Xcode already installed, make sure that it is up to date by using Software Update.

2. **Install Command line Tools for XCode.** Install them by running Xcode > Preferences > Downloads.



Check that the installation was successful by opening a terminal window and typing

```
$ which gcc
/usr/bin/gcc
```

You should see an output similar to the one above.

**3. Install MacPorts.** This is a package manager that helps installing many GNU packages compiled for Mac. In terminal type

```
$ which port
/opt/local/bin/port
```

If you get an output similar to the one above, then you have MacPorts. If MacPorts is installed, check that it is up to date by running these commands in terminal

```
$ sudo port selfupdate
$ sudo port upgrade outdated
```

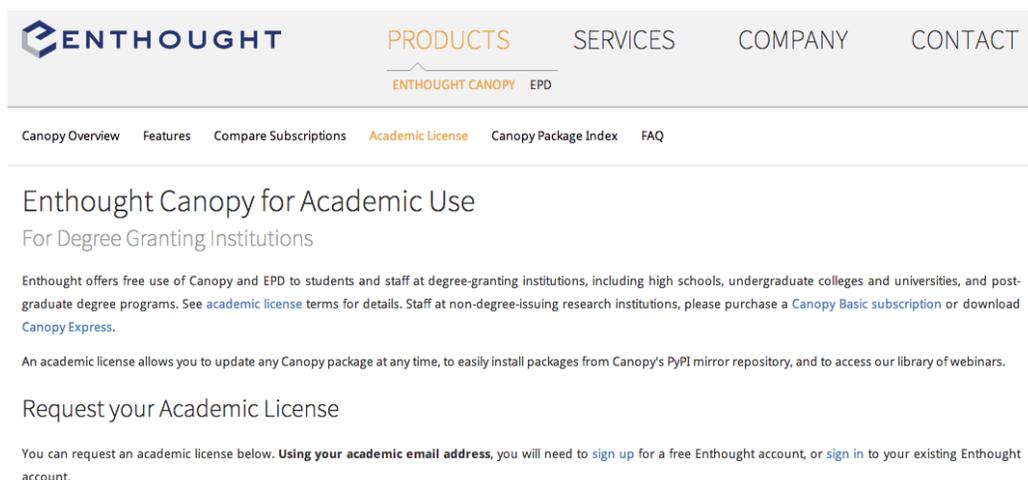
The first command will update MacPorts definition and the second one will upgrade outdated packages.

**WARNING:** These two commands might take some time to run.

If you do not have MacPorts installed, then get it from <http://www.macports.org/>.

**4. Make account in Enthought using an academic email account ending in .edu.** You can create a account in Canopy Express or at <https://www.enthought.com/accounts/register/>. It is important to use your university email so you will get free access to the “Package Manager”.

After you create your account, sign-in and navigate to Products > Enthought Canopy > Academic License to request the license

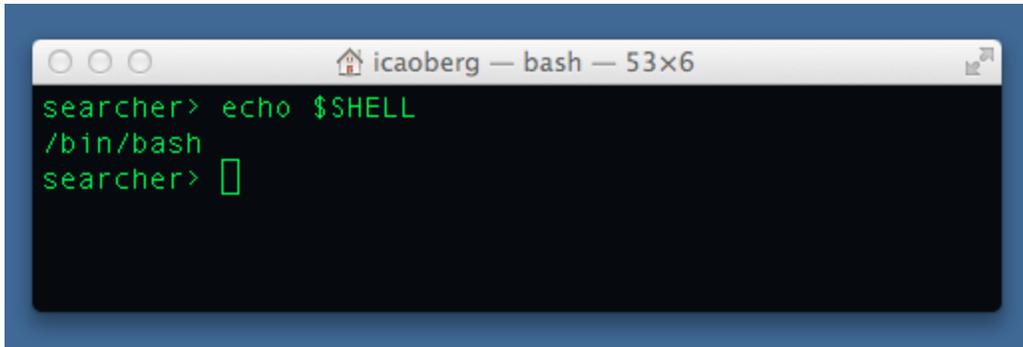


The screenshot shows the Enthought website navigation bar with the logo and menu items: PRODUCTS, SERVICES, COMPANY, and CONTACT. Below the navigation bar, there is a secondary menu with links: Canopy Overview, Features, Compare Subscriptions, Academic License (highlighted), Canopy Package Index, and FAQ. The main content area is titled "Enthought Canopy for Academic Use" and "For Degree Granting Institutions". It contains text explaining that Enthought offers free use of Canopy and EPD to students and staff at degree-granting institutions, and provides a link to the academic license terms. It also mentions that an academic license allows for updates and access to a library of webinars. At the bottom, there is a section titled "Request your Academic License" with a note that users need to sign up for a free account or sign in to their existing account to request the license.

**5. Install Enthought.** It is Python distribution with a GUI, integrated code editor and IPython

console that comes with numpy+scipy+matplotlib+PIL+ipython.

Before installing the software we need to make sure that bash is our default shell. In terminal type

A terminal window titled 'icaoberg — bash — 53x6' with a dark background and green text. The user enters the command 'echo \$SHELL' and the output is '/bin/bash'. The prompt 'searcher>' is visible at the beginning and end of the command line.

```
searcher> echo $SHELL
/bin/bash
searcher> █
```

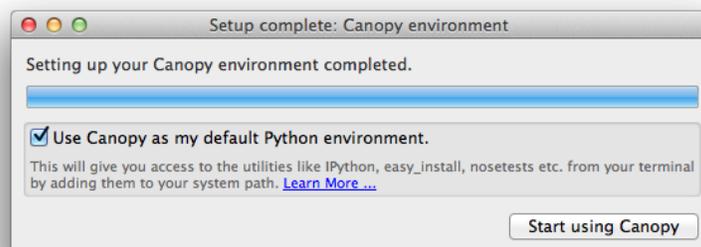
If /bin/bash is not the output of the command, e.g. /bin/tcsh, then bash is not your default shell. To change your shell the bash, simply type

```
$ chsh -s /bin/bash
```

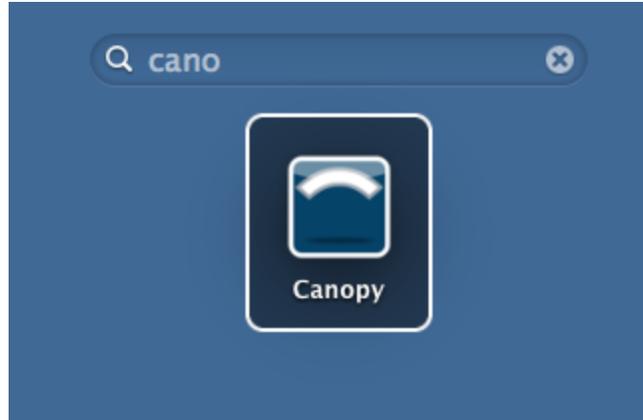
And follow the instructions.

Now, get Canopy Express from <https://www.enthought.com/products/epd/free/>. Be sure to download the copy that is consistent with your architecture, that is 32 or 64 bit.

**WARNING:** The first time you run Enthought be sure to click the use of Canopy as a default Python environment.



If you do not wish to start using Canopy at this point, you can access the software from the Applications folder or Launchpad.



6. **Sign-in.** After you click “Start using Canopy”, login with the account created in step 4.

7. **Install pip.** Before we install pip lets verify that easy\_install was successfully installed. In terminal type

```
$ which easy_install
/Users/icaoberg/Library/Enthought/Canopy_32bit/User/bin/easy_install
```

You should see an output similar to the one above. Since easy\_install points to Enthought, type in terminal

```
$ sudo easy_install pip
```

After installing pip, verify that pip points to the right location by typing in terminal

```
$ which pip
/Users/icaoberg/Library/Enthought/Canopy_32bit/User/bin/pip
```

8. **Restart your computer.**

## II. Install the Dependencies

You will need a terminal for all the next steps.

1. **Install libFreeImage.** Before we install this package lets verify that MacPorts was successfully installed. In terminal type

```
$ which port
/opt/local/bin/port
```

Since MacPorts was found, lets install libfreeimage by typing in terminal

```
$ sudo port install freeimage
```

**WARNING:** Installing packages using MacPorts can be painfully slow. You might spend about an hour installing just this package.

**2. Install mahotas.** Before we install this package lets verify that Enthought was successfully installed and linked to terminal. In terminal type

```
$ which pip
/Users/icaoberg/Library/Enthought/Canopy_32bit/User/bin/pip
```

You should see something similar to the above. *Hint:* the change in prompt to Canopy 32bit is an indication it worked as well. In terminal type

```
$ sudo pip install mahotas==0.6.6
```

To test that mahotas was successfully install type in terminal

```
$ which ipython
/Users/icaoberg/Library/Enthought/Canopy_32bit/User/bin/ipython
```

this will verify ipython is pointing to the right distribution. Then in terminal start ipython

```
$ ipython
Python 2.7.3 | 32-bit | (default, Mar 25 2013, 15:42:04)
Type "copyright", "credits" or "license" for more information.
```

```
IPython 1.0.dev -- An enhanced Interactive Python.
?          -> Introduction and overview of IPython's features.
%quickref  -> Quick reference.
help       -> Python's own help system.
object?    -> Details about 'object', use 'object??' for extra
details.
```

```
In [1]: import mahotas
```

```
In [2]: mahotas.__version__
Out[2]: '0.6.6'
```

**3. Install PySLIC.** Now that mahotas is available, we can read images and process them. We need to install pyslic to calculate features on images. Since we verified pip and ipython are working in the previous step we don't need to do it again. In terminal type

```
$ curl -o pyslic_0.6.1.1.zip
http://developers.compbio.cs.cmu.edu/python/pyslic_0.6.1.1.zip
$ unzip pyslic_0.6.1.1.zip
$ cd PySLIC-0.6.1.1
$ sudo python setup.py install
$ cd ..
```

To verify it install successfully

```
$ ipython
Python 2.7.3 | 32-bit | (default, Mar 25 2013, 15:42:04)
Type "copyright", "credits" or "license" for more information.
```

```
IPython 1.0.dev -- An enhanced Interactive Python.
?          -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help       -> Python's own help system.
object?    -> Details about 'object', use 'object??' for extra
details.
```

```
In [1]: import pyslic
```

Now we can calculate features on images.

**COMMENT:** This version of pyslic is not dependent on milk. That is why we are downloading a copy from developers rather than installing using pip.

**5. Install ImageMagick.** We need to use the convert tool for converting between image file formats. To install it type in terminal,

```
$ sudo port install imagemagick
```

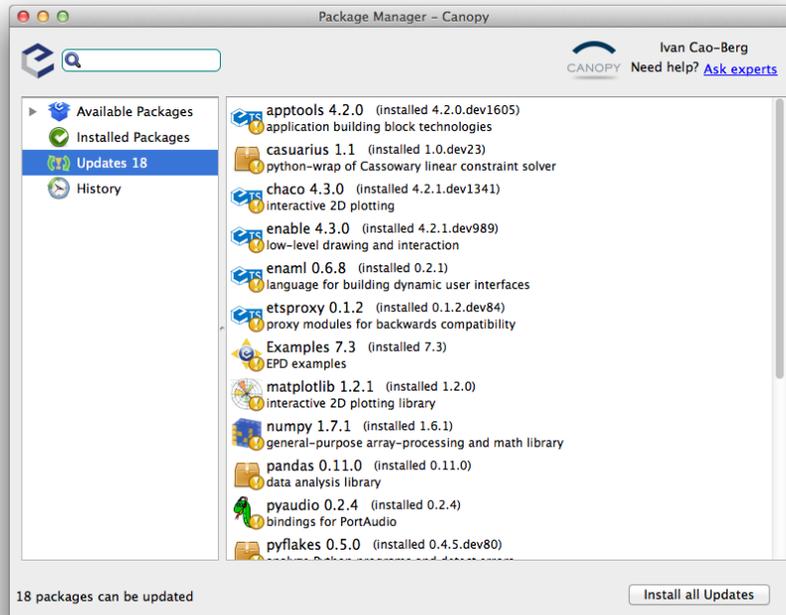
**WARNING:** This command will take some time to run.

To verify that the tool ImageMagick has been installed successfully, in terminal type

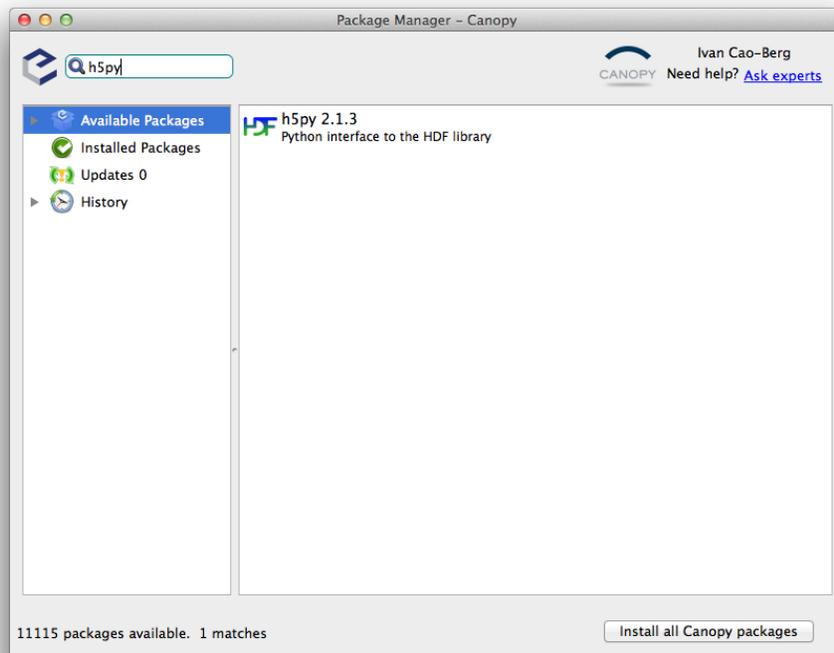
```
$ which convert
/opt/local/bin/convert
```

**6. Install the python packages required for this software using Enthought's package manager.** Open Canopy Express and sign in using your account. Then go to the "Package Manager".

**COMMENT:** It is easier to install these dependencies using Enthought than to use pip or easy\_install. We need to install hdf5.  
But first, before installing any packages, let's update the existing ones.



The screenshot above shows the package manager. Click “Install all Updates” to upgrade all the packages.



After all the packages are updated just type h5py in the search box and click “Install”.

### III. Downloading and Installing OMERO.searcher

Visit the Murphy lab website to download the latest version of OMERO.searcher

<http://murphylab.web.cmu.edu/software/searcher/>

As of this publication, version 1.3 is the latest stable version of the local client. If you want to get and install the client from terminal; you can type

```
$ curl -o omero.searcher.client-v1.3.tgz
http://murphylab.web.cmu.edu/software/searcher/omero.searcher.client-
v1.3.tgz
$ tar -xf omero.searcher.client-v1.3.tgz
$ cd omero.searcher.client-v1.3
```

If you have followed all the instructions, then you are ready to use the local client.

### IV. Running a Test

To verify that the local client is working properly, run one of the tests included with the client. In terminal type

```
$ bash ./tests/test_HPA_slf34.sh
OMERO.searcher Local Client version 1.3
/opt/local/lib/libfreeimage
['proteinatlas.org']
Checking for new stable version...
Version is up to date.
Loading content database(s) (this may take a while)...
Loading content database for featureset slf34, server
proteinatlas.org
No list of available content databases found at
http://proteinatlas.org/searcher/
Using local copy of content database, which is same as latest
version, also available on murphylab.web.cmu.edu
Checking protein and DNA image lists
1 images found
scale from query images is 0.08
scale/s from database is 0.08
rankSearchSet using dscale: 0.08
Calculating features for query set from local images
Using supplied feature calculation function: calc_slf34 at scale:
0.08
there are 173 features calculated
search set has 1 images
Ranking images
rankSearchSet using dscale: 0.16
Calculating features for query set from local images
Using supplied feature calculation function: calc_slf34 at scale:
0.16
there are 173 features calculated
search set has 1 images
Ranking images
rankSearchSet using dscale: 0.32
Calculating features for query set from local images
Using supplied feature calculation function: calc_slf34 at scale:
0.32
there are 173 features calculated
search set has 1 images
Ranking images
rankSearchSet using dscale: 0.64
Calculating features for query set from local images
Using supplied feature calculation function: calc_slf34 at scale:
0.64
```

```
there are 173 features calculated
search set has 1 images
Ranking images
rankSearchSet using dscale: 1.28
Calculating features for query set from local images
Using supplied feature calculation function: calc_slf34 at scale:
1.28
there are 173 features calculated
search set has 1 images
Ranking images
Making HTML results file
```

**You will notice some files have been created in your directory**

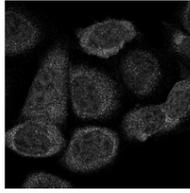
```
$ ls
HPA_11-H9-2_2.html      proteinatlas.org-slf34-v3.pkl  scripts
images                  proteinatlas.org_version      tests
murphylab.web.cmu.edu_version  pyslic                          version
omero.searcher.py      ricerca
```

**Essentially, a content-database (proteinatlas.org-slf34-v3.pkl) and a report (HPA\_11-H9-2\_2.html). If you open the HTML file in a web-browser you should see something similar to the next screenshot.**

## OMERO.searcher results

images/proteinatlas/11\_H9\_2\_green.bmp  
 images/proteinatlas/11\_H9\_2\_blue.bmp

Query Image(s)



Content Database [proteinatlas.org-slf34-v2.pkl]  
 Original Scale 0.08  
 Comparison Scale/s [0.08, 0.16, 0.32, 0.64, 1.28]  
 Feature Set slf34  
 Number to Retrieve 10

### Results

0.08		0.16		0.32		0.64		1.28	
Thumbnail	Image Data								
	<a href="#">Info</a>								
	<a href="#">Info</a>								
	<a href="#">Info</a>								